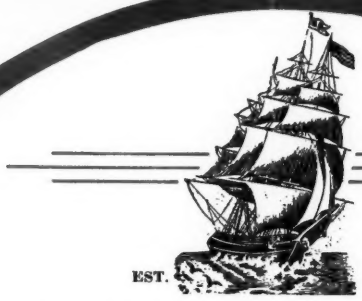
The American Fertilizer

Vol. 95 AUGUST 2, 1941 No. 3



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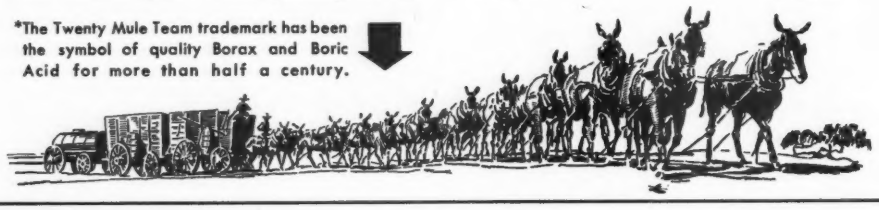

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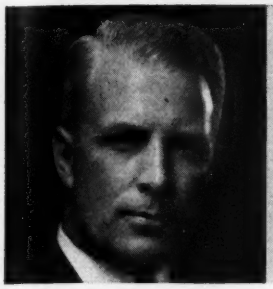

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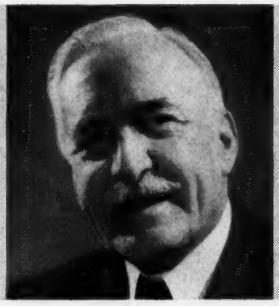

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Vol. 95 AUGUST 2, 1941 No. 3

American Potash Independence Achieved*

By HORACE M. ALBRIGHT

Vice-President, United States Potash Company, Inc., New York, N.Y.

INDEPENDENCE in the potash industry means that the industry has reached that stage of development when it is certain that it can meet the requirements of the manufacturers of fertilizers and chemicals in the continental United States, its territories and possessions, and Canada and Cuba. When the potash field in the Pecos Valley of New Mexico was discovered over ten years ago and production of potassium salts began, our country and Canada and Cuba were potentially independent of European potash, for the field is extensive and development of mines and refineries was sure to be financed and carried to completion as fast as users of potassium materials were willing to buy from American producers rather than from the importers of foreign supplies. Growth also was bound to be enhanced by results of research in the use of potash as a fertilizer material leading to an agricultural consumption both in increased amounts and in more efficient ratios to other plant foods.

From the beginning of the American potash industry the manufacturers of fertilizers have strongly supported the domestic producers and have increased their purchases from year to year, not only to supply the increasing tonnage going into mixtures due to the growing percentage of potassium as a plant food in fertilizers, but to progressively reduce their purchasing of the foreign materials in favor of the new materials from American sources.

Thus, we have seen a great new industry grow with exceptional speed and efficiency, due to the characteristic American factors of diligent exploration; fine technological work of engineers, chemists, and agronomists; and resourcefulness in management and finance; aided by a patriotic, far-seeing and sympathetic associated industry ready to buy its output as it developed through the years.

Now in an international crisis and when national defense is the order of the day, both the potash industry and its friends in the fertilizer industry can be proud of the fact that American needs for potash can be fully met without any recourse whatever to foreign sources of supply, and, after all, effectiveness in national defense is the final test, if one were needed, to prove the value of the industry to the American people.

When war was declared in 1914, the price of potash soared from $35 to $350 and even to $500 a ton of 50 per cent muriate. In 1939, when war was declared, the price was $25 a ton and there it has remained to date. Two significant facts are contained in this statement —in addition to the stability in price during the present crisis, that price is lower today than it was in 1914; $35 then, $25 now. The price increase in 1914 clearly indicated two things: (1) the importance attached to potash by the people of the United States, and (2) the desperate situation in which they found themselves at that time. That importance related to both agriculture and industry. The absence of any price increase in 1939 indicates that one or the other of these two factors no longer existed. The fact that during the years intervening between these two analogous situations our consumption of potash had increased from 250,000 to 400,000 tons K_2O shows clearly that the importance of this commodity to agriculture and industry had won even much greater appreciation by the American people. Therefore the absence of a desperate situation in 1939, and in fact the failure of a crisis of

* An address before Convention of the National Fertilizer Association, White Sulphur Springs, June 10, 1941.

any sort to develop, could only mean that the American potash industry, which had been under development since the World War, has progressed to the point where is is entirely competent to supply domestic needs at normal prices.

In 1913, the United States had only an initial trace of a potash industry, it being in that year that the American Trona Corporation, now the American Potash and Chemical Corporation, began its developmental work at Searles Lake, California.

It is recalled, however, that a few years earlier, in 1911, the Federal Departments of Agriculture and Interior inaugurated a nation-wide search for potash raw materials with a view to the possible development of an American industry. Then followed the World War during which emergency all of these potash-bearing materials, natural and artificial, were aggressively exploited with very good success as emergency measures to meet, to a limited degree however, our domestic demands—desperate as reflected by the extraordinary prices then prevailing. These enterprises were subsequently abandoned, however, with the return to more normal prices for the imported commodity.

The American Potash Industry Begins

In 1924, the late Senator Morris Sheppard of Texas introduced a bill into Congress providing for the exploration of the Permian Basin of the southwest, where it had long been known there lay buried a huge deposit of salt. This bill was passed in 1926, whereupon this survey was undertaken by the Federal Departments of Interior and Commerce. In these explorations the core drill was employed to bring to the surface the undissolved and unbroken cross-sections of the strata of water-soluble salts penetrated. These cores were analyzed, and as the result potash salts were found underlying an area of some 40,000 square miles of west Texas and southeast New Mexico; principally, however, as polyhalite, and for the most part in strata or beds too thin to be commercially feasible. Coincidentally, in 1926, the Snowden & McSweeney Oil Company exploring for oil in the Carlsbad area of New Mexico, on encountering water-soluble strata containing potash, likewise employed the core drill and eventually discovered the rich strata of sylvanite which have now been proved to underlie several square miles in this immediate neighborhood.

As a result of these findings the United States Potash Company (originally the American Potash Company) was formed in 1926 for the development of a mine and construction of a refinery. The first mine shaft to be sunk ran into the hoped-for deposit of high-grade ore in January, 1931; and was developed by the early part of 1932 into a property of excellent working conditions, exposing substantial ore bodies, clearly minable at a reasonable profit. This was followed by the completion of the first unit of the refinery in the fall of 1932.

The Potash Company of America completed its first refinery unit in 1935, which in turn was followed a few years later by the Union Potash and Chemical Company with deliveries beginning in October, 1940.

In the meantime the American Potash and Chemical Company at Searles Lake, California, had solved its many technical problems involved in the commercial application of intricate phase rule principles, and as a result not only greatly increased its production of potash, but added thereto a long list of commercial chemicals recoverable from the complex brine—the raw material on which that industry is based. And finally, as the result of adherence to a long-cherished idea, potash is now being produced commercially by Bonneville Limited from the dilute potash brines underlying the great salt flat of western Utah.

Production Adequate for America's Needs

As the result of these prolonged and combined efforts to establish an American potash industry adequate for the needs of the North American Continent and outlying islands, we currently have a production capacity of 40,400 tons refined K_2O per month, to be increased by November to 47,600 tons per month through additional equipment now being installed. This output is principally in the form of 98% potassium chloride equivalent to 62.5% K_2O, high grade potassium sulphate and sulphate of potash magnesia.

In the Carlsbad area, mining capacity exceeds present refining capacity by some 200,000 tons run-of-mine salts per annum. This represents an additional supply for export under our Good-Neighbor Policy and also for domestic consumption where the use of the lower grade salts is found desirable.

By November, accordingly, we shall have an annual production capacity of 570,800 tons K_2O in the potash year in the form of high-grade potash salts, with the practically unlimited additional supplies of 25 per cent run-of-mine salts to supply the North American requirement, agricultural and chemical, of 504,-

000 tons K_2O. Entering into this total of requirements are: United States, Puerto Rico and Hawaii, 432,000 tons K_2O; Canada and Cuba, 27,000 tons; or a total agricultural of 459,000; in addition to which 45,000 tons K_2O in the form of refined muriate is the requirement of the chemical industries. Fortunately, agriculture sets no very high standards of purity; but the chemical industries require a highly refined chloride for conversion into caustic, carbonate and Chlorate. The carbonate, it is recalled, is used in the manufacture of the finer grades of glass required for optical prisms now in special demand by the Army and Navy.

Greater Demand for High-Grade Salts

There is a further interesting comparison between the years 1913 and 1940. In 1913, we imported 225,000 tons K_2O of agricultural potash from Germany in the form of a million tons of salts. In 1940, our agricultural deliveries were 444,000 tons K_2O contained in 800,000 tons of potash salts, an increase of 219,000 tons K_2O with a decrease of 200,000 tons in gross tonnage. The answer is obvious that during this period the low-grade salts have been supplanted by the high grade, during the past three years an average of only some 25,000 tons K_2O being used in the form of the low-grade salts. This change has come about principally since 1926, in which year we imported some 500,000 tons of potash salts in the form of kainit and manure salts, and has resulted from the development of refining techniques perfected to the point where it is now more economical to remove the sodium chloride constituent than to pay transportation charges on it. The reason for this change, therefore, relates more to the economics than to the agronomics of potash use, although both considerations enter into the picture. These low-grade salts were used principally along the Atlantic seaboard, and since the fertilizer-mixing industry is concentrated largely in the southeast, it was in that region where most of them were used.

An analysis of State recommendations in their bearing on the fertilizer grades produced by the missing industry shows that the southeast is the section where the lower grade of salts can be used, in part at least, to prepare the grades containing the plant food ratios recommended by the agronomists of that section. Freight charges constitute a less important part of the delivered price in these southeastern states, and the fertilizer grades being sold there at the present time can be formulated easily with potash salts analyzing from 22.5 per cent to 30 per cent K_2O. Likewise, in the Middle Atlantic States it is possible to combine manure salts and high-grade muriate to formulate the most common mixtures sold. From state reports of fertilizer sales it appears that a considerable quantity of low-analysis salts is still sold direct to farmers. During the 1938-39 season, 32,687 tons of manure salts and "kainit" in the southern states, and 1,284 tons in the Middle Atlantic States were sold as such. In some instances, according to past reports, these salts were prepared from high-grade salts cut to the low-analysis by the addition of fillers. Here certainly is a logical use for additional tonnages of run-of-mine salts.

Such increases as those here mentioned in the use of run-of-mine salts in the formulation of fertilizer grades containing less than 20 units of plant food can be re-instituted for the time being, at least, without any economic repercussion on either the mixing industry or the farmer, and without any justifiable reduction in the potash ratios of mixed goods.

In the northeast, however, where double-strength fertilizers are becoming increasingly popular, and in the midwest where state recommendations are quite different, the continued use of the high-grade salts is more imperative.

Second World War Finds Different Conditions

The situation in 1939, when a second World War started and in 1941, after that war had continued for some two years, is in striking contrast to that earlier period of 25 years ago. The reason has been made clear; an American industry developed to the point where it can take care of North American requirements without any derangement of the fertilizer industry which is the purveyor of potash to the American farmer. In 1939, with supplies still being drawn from Europe, the American producers were finding it advantageous to export a considerable percentage of their production—their high-grade salts being in greater demand for such purpose. Upon the outbreak of the war in Europe, however, this export business was immediately terminated so that the entire domestic production could be thrown into the American market. With such supplies made available in this market there was no occasion for increased prices, and for that reason and that reason alone prices were not increased. In consequence, today potash prices are lower in the United States than in any other country outside of Europe. It therefore becomes the preferred market in which to buy supplies re-

(Continued on page 24)

Opportunities for Improving Southern Agriculture*

By DR. R. F. POOLE

President, Clemson Agricultural College, Clemson, South Carolina

THIS country is in a very comfortable position of over-production phenomena, and is it more advantageous to a country to have over-production and not under-production? Every one in this meeting agrees that over-production is good in a democratic country. I do not believe that the city dweller fully appreciates the value of over-production to his livelihood but sometime it may be brought closer home to him. All of the research in agriculture has contributed as much or more to the well-being of the city dweller than it has to the farmer. The agricultural agencies of this country have done yeoman service in perfecting and standardizing quality products far beyond expectations and with results that may later prove significant in the world. "More power to them" should be our motto.

The pioneering days in this country are gone. Even before the World War began, we saw the coming of new complexes. Perhaps it is a well-defined evolution not only in plants but in human complexes as well. Science's contributions to the world have become too problem-making—inconceivable to the education and contentment of pioneering behavior. The conditions precipitated an unbalanced world of people living in an atmosphere with no continuity. We were not then prepared to meet the situation and today we are no more ready to meet the problems than we were yesterday. Our technique, it seems, has not been properly developed.

That the system of distribution is problem number one in this country cannot sincerely be disputed. One of the bones of contention in southern states has been inequality of freight rates, and as long as this remains an obstacle it will prove detrimental to southern agriculture. The truck has tended to correct this problem, but not satisfactorily. This problem has hampered programs in the development of quality as well as quantity produce and has had much to do with the cotton one-crop system remaining a nightmare to southern farmer prosperity. Indirectly this contributed to the weakness of the system of farming whereby there is not a proper balance between plant and animal production.

I concede that the southern states have not been able to establish quality products for marketing to the "choosey" consumer, but great progress is being made along this line. We wish to learn where markets exist and when they are receptive to certain commodities. I was told recently that hog lard was selling last fall in South Carolina at a price lower than soy-bean fats from other areas. This no doubt indicates that advertised and controlled distribution of certain products has worked well for the farmer who advertises. Perhaps competitive educational propaganda is advisable and becomes necessary for all farmers' interest. Technological schools have made progress. There are some people who have sought to change the course of education in the technological schools, by impregnating the curricula with sociology, economics, psychology, and other so-called humanities. We wish to stop them. Despite the tremendous progress the technological schools have made since the Morrill Act was passed, and despite the fact that demands for graduates of the technological schools have been increasing, even far greater than of universities and liberal arts schools, and despite the fact that graduates from the technological schools have made good in a practical world, the movement is viciously going forward. The agronomist, the soil chemist, the horticulturist, and the animal husbandryman teach sound economics. They could not do a good job of teaching in a technological school without presenting economic theory. Whom do you see about the economics of fertilizer usage? I know that you spend much time with the agronomist or person directly concerned with studying fertilizers and their effect on crops. Modern economics does not present the true picture of the farmer's welfare and leaves him in a confused state, a state of apprehension and of unreal life.

Sociology and psychology remind me of what an old farmer remarked when I told him how to control a sweet potato disease. He said, "I know what to do all right but I don't have time

* An address before the Convention of the National Fertilizer Association, White Sulphur Springs, June 11, 1941.

to do it." It has been said that many of the best men in civic clubs in our cities are country reared. It is therefore conceivable that they hold respectable if not lucrative positions. They could not hold these positions, especially in this competitive age, without having good humanistic characters. I shall close this argument by saying that the problems of the future cannot be solved by prejudicing people, by creating race hatred, by building mountains out of mole hills, and by wishful thinking that all people can have equal capital. We must remember that the idealist's conception of controlling the poor is not practical, but it sounds good to the classes susceptible to prejudice.

All people are born equal, but all people do not choose to live equal. Therefore, in America as well as elsewhere, there are hundreds of thousands of people who would starve, were it not that some one has done some thinking for them, employed them, and sometimes fed and clothed them. There is some evidence that many of our people are so diseased that all initiative is lost and the will to succeed and achieve is destroyed. The plant breeder freely admits that there is degeneration in plants. It is equally as true of human beings. In the southern states we have had some good leaders, but they have not been abundant enough to develop the visible opportunities now latent in great numbers in this section where precipitation is good and the climate excellent for good living. For a time following the War between the States, many potential leaders followed Horace Greeley's suggestion and went West and North, but today more of the graduates of southern institutions are remaining in the southern states. People are beginning to realize that the southern states offer excellent opportunities for living wholesome lives—and even for the making of wealth.

The southern states have a homogeneous white group, composed of pioneering American stock, and a negro group. This section, therefore, has no serious racial complex. There is an understanding population existing in the southern states. Furthermore, there is sympathy of one for the other and when the white farmer prospers, so does his negro tenant. I firmly believe that were conditions made more tenable for the white farmer's prosperity, there would be a proportional rise in the standards of negro life. The southern farmer, and the South as a whole, is more appreciative and sympathetic to the negro than any other people in America will ever be. Common sense dictates this feeling for the negro. I believe the opportunities of building a greater South will concern both races, provided sociologically minded people in other areas of the United States have sense enough to face the facts and accept the fact that the relations of white and negro in the South have been good for generations. It is said that misery likes company and that may prompt some of the existing movements.

I have always appreciated the true relation between researcher and producer and have always worked for an understanding between them. The colleges may discover and perfect but they are not charged with production procedure. Working with the Tobacco Research Committee and manufacturers of fungicides has demonstrated to me how advantageous it is for both interests to cooperate. Even closer cooperation and understanding seem advisable. The agricultural agents of railroads have shown southern planters opportunities for valuable diversification practices. The watermelon, peach, tomato, dewberry, strawberry, cantaloup, cucumber, lettuce, and pepper industries of the southern states owe much to the efforts of the railroads.

The educational range of the average southern farmer is rarely beyond the bounds of the county in which he lives—sometimes it does not go that far. He is therefore dependent on the judgment of educated farmers and educated agricultural leaders to steer his course. There are some farmers so hardened and married to cotton and tobacco production that they manifest no interest in diversifications, which must of necessity be gradual and systematic with ability to market. There are some who have a sincere feeling that there are too many agencies advising the farmer. I do not hold any such belief. I believe we need more workers than are now employed—especially in research. Perhaps the agencies are not sufficiently coordinated for sound approach. Duplication and repetition of effort may be harmful in some instances, but there is certain to be eventual standardization.

A very large percentage of the research efforts in the southern states has centered around cotton. Even this has not been impressive. Very little valuable information is available on the many crops that are adaptable to the climate and soil of the southern states. There is not very much known about grasses for pastures and for supplementing pastures for cattle food. It is certain that animal and plant production cannot be properly balanced until more is known about plant production. The damson, the cherry, the pumpkin, and

(Continued on page 20)

Putting Fertilizer Where It Can Do the Most Good*

By FIRMAN E. BEAR

Head, Department of Agronomy, Rutgers University, New Brunswick, N. J.

IN THE eighth edition of his book on "The Use of Artificial Manures," Dr. Paul Wagner, world-famous fertilizer expert of Germany wrote:

"Of soils that are deficient in them, the crop recovers the first year only from 10 to 20 per cent of the added phosphoric acid, and from 40 to 60 per cent of the added potash. The applications of phosphoric acid required to produce the crop increases desired must, therefore, be multiplied by from 5 to 10, and those of potash by from 2 to 3, if such increases in yield are to be obtained. Nitrogen fertilizers can be applied more nearly in proportion to the need of the crop and soil."

Most German farmers apply their fertilizers broadcast after the land has been plowed. Phosphates and potash salts are normally applied before planting, and most of the nitrogen after the crop has gotten under way. Originally much the same practice was followed in this country. But two fundamental changes in procedure have occurred. The present practice is to apply fertilizer along the row at planting time, and to include a large part of the nitrogen in this at-planting mixture.

Our knowledge of what happens to fertilizers when they are applied to the soil having been greatly increased as the years have gone by, we should now be able to suggest still better procedures in the use of fertilizers than have been employed to date. It is the purpose of this paper to consider some of the possibilities along this line.

When a well-balanced culture solution, which is capable of producing a luxuriant growth of a given crop, is applied to a soil, it quickly becomes unbalanced. The soil exercises certain fixation effects. The agencies responsible for these effects differ for each plant food element. Nitrogen is fixed by being consumed by the soil micro-organics. The problem frequently arises in soils containing large amounts of fresh organic matter of the non-leguminous type. Phosphate fixation results largely from the precipitating action of iron and aluminum. it is especially troublesome on acid soils. Potash fixation is the result of the formation of insoluble potash minerals in soils. It is most acute in hot, dry seasons.

The question arises: Can one apply a mixed fertilizer in such a manner as to avoid excessive fixation by all three of these very different processes, without sacrificing the effectiveness of the fertilizer? This presents a problem, since it would appear desirable to apply the nitrogen ahead of planting in order to effect rapid rotting of the strawy organic matter; it would seem best to place the phosphate in bands so as to avoid having any more of it than was necessary in direct contact with the soil; and it should be good practice to plow potash under in order to have it down deep in the soil where drying-out is not likely to occur.

Although it appears difficult to comply with these requirements, the livestock farmer does it. His standard practice is to apply phosphated manure to a clover sod, and to plow under the whole mass of leguminous sod, manure, and phosphate. If a jointer is attached to the plow, the phosphated manure is wrapped up in a roll of sod in much the same manner as a hot dog is hemmed in by a bun. Some of the phosphate may dribble out of the manure and drop onto the bottom of the furrow, just as the mustard may escape from the bun; but, in either case, little of it comes in direct contact with the soil.

Assuming that 50 pounds of 20 per cent superphosphate is applied to each ton of manure before it is hauled to the field, a 12-ton application of phosphated manure will supply the equivalent of one ton of 6-9-6 fertilizer. The nitrogen of the legume sod and of the manure is in direct contact with the organic matter where it is most effective in speeding up decay; the superphosphate is surrounded by organic matter, which retards its fixation by the soil; and the potash of the manure is down where the soil stays moist most of the summer.

Two improvements need to be effected to make this practice apparently perfect. One is that of using a small additional amount of fertilizer along the row at planting time, so as to give the seedlings a quick start and enable their roots to rapidly reach the phosphated manure. The second is that of plowing under

* An address at the Fertilizer Conference, State College, Pa., June 24 and 25, 1941.

a liberal application of lime in conjunction with the manure, so as to raise the pH of the soil in the bottom of the furrow to the point at which there is little soluble iron and aluminum remaining to fix the phosphate as it is released by the decay of the organic matter.

In the absence of manure, farmers make more use of cover crops, and apply larger amounts of fertilizer. The question then arises as to whether equally good results cannot be obtained by broadcasting a large part of this heavier application of fertilizer over the cover crop before it is plowed under. Judging by increasing numbers of farmers who are putting this practice into effect. and by the results which they have obtained, this system is effective. The essential supplement to this practice is that use be made of a starter solution in the case of tomatoes, cabbages, and tobacco, or of a small along-the-row application of fertilizer in the case of corn and vegetables.

However, many farmers still apply all of their fertilizer along the row. Cotton, tobacco, tomato, and sweet potato growers tend to place the fertilizer in a furrow and bed on it, the seed or plants being set in the bed directly above the fertilizer. Corn growers place the fertilizer in bands along both sides of the row, a little to the side and a little below the seed or seedpiece. Wheat, oats, and barley producers apply the fertilizer in direct contact with the seed, allowing both seed and fertilizer to run down the hose together.

This along-the-row system of applying fertilizers was developed at a time when the rate of application was relatively small. Farmers found it difficult to spread 100 to 200 pounds of fertilizers evenly over the land. Furthermore, it was soon found that when these small quantities were used, the along-the-row method was more effective in stimulating crop growth. At first, the fertilizer was placed in direct contact with the seed; but, as the rate of application increased, it was found necessary to mix the fertilizer with the soil beneath the row in which the seed or plants were to be planted. In due time machinery was developed that placed the fertilizer under the row and mixed it with the soil all in one operation, or placed it along the row at the same time it planted the seed, the fertilizer and seed being separated by an inch or two of soil.

But rates of application of fertilizers are still being stepped up, and some of our procedures are not applicable to these higher rates. If one wants to apply 1,000 pounds of fertilizer for corn, which would undoubtedly be a good investment on many eastern farms, how would he apply it? If he wants to apply enough fertilizer to his wheat to take care of the needs of the following crop of clover, he cannot let all of it run down the hose with the seed. And how can a vegetable or truck crop farmer apply one ton of fertilizer along the row and avoid killing the young plants?

The tendency in such cases is toward a broadcast application of the fertilizer on top of the plowed soil before the crop is planted. The fertilizer is then harrowed or disced into the soil. Such a practice results in giving the soil its maximum opportunity to fix the phosphate and potash. Furthermore, much of the fertilizer is located in dry soil where it is positionally unavailable in dry weather.

The only farmers who have solved this problem to their own satisfaction are the potato growers. They place the fertilizer along the row, at the rate of one ton per acre, by the use of a highly-specialized machine which has been particularly designed for this purpose. But even here, doubts are beginning to arise, as evidenced by the recent trials of a high-low method of applying fertilizers. In this system, one-half of the fertilizer is applied in the usual near-the-seed position on one side of the row, and the remaining half is applied several inches deeper, on the other side of the row.

Meanwhile, the tomato growers are finding that a good starter solution, rightly applied, will work wonders on a tomato crop. But if the starter solution is used, it is not safe to put the remainder of the fertilizer in a furrow under the row. The question is, where shall the remainder of the fertilizer be placed? Many of the tomato growers are getting excellent results by plowing it under.

It is apparent that we shall have to reconsider this whole problem of applying fertilizers from the point of view of the larger amounts of fertilizer that are now being used. This problem has arisen as a result of the loss of manure and of sod crops for plowing-under purposes. We now know that we shall have to grow more organic-matter crops. Some of the progressive farmers have adopted the policy of resting their land every fourth or fifth year, using two winters and one whole summer for this purpose. This simply means that they are proposing to produce manure in the soil rather than inside a horse. But before they plow this synthetic manure under, why not top-dress it with lime and fertilizer just as they would if they were plowing under phosphated manure? Fertilizer placement studies should answer the question of what changes must be made as larger acre applications are employed.

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No Fear of Fertilizer Shortage

Fears that acute shortages of fertilizer supplies, such as existed during the World War, will confront the farmer in production of emergency crops for the coming year were quieted recently by Charles J. Brand, Executive Secretary and Treasurer of The National Fertilizer Association, in an address before a meeting of fertilizer executives and agricultural workers of Texas, Louisiana, and Oklahoma, at Shreveport, La.

"Consensus of estimates of Government and industry authorities made in recent days is to the effect that there will be no such shortages of fertilizer materials as we experienced in the last World War. Nitrogen, which is necessary for munition manufacture as well as fertilizer, can largely be supplied by our own plants. The difference between whether we have adequate supplies or experience a moderate shortage is dependent in a large measure upon whether or not we can obtain ships for transportation of nitrates from Chile. Potash, for which we were dependent upon foreign sources exclusively during the World War, is now produced within our own borders in quantities sufficient for our agricultural needs.

"There is enough phosphate rock in the country," said Mr. Brand, "to supply the demand for fertilizers for the next three thousand years. The efficiency of the industry's plant capacity is such that it can today produce twice as much as it has ever been called upon to put out—this without any Government manufacture whatsoever.

"However, shortage of shipping facilities entailing increased transportation and handling costs as well as wage increases will be reflected in the price of fertilizer which has through the years been abnormally low, compared to other commodities which the farmer buys."

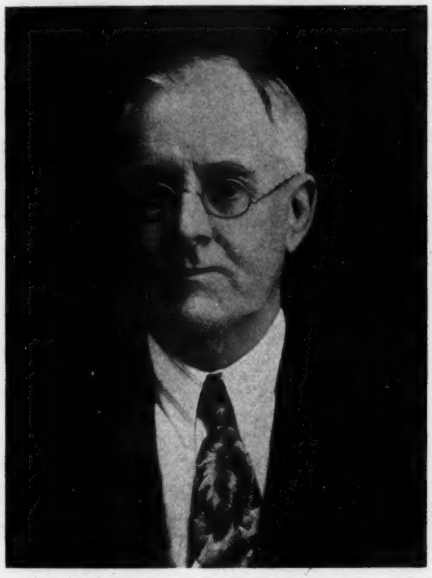
Mr. Brand also warned the meeting against any such suicidal overexpansion of our Nation's agricultural plant such as was made during 1914-18. He pointed out the fact that from August until the first of June only 960,000 bales of cotton were exported, whereas in the same period the year before 6,105,000 bales were sold abroad.

Obituary

PHILIP H. MANIRE

The fertilizer industry has lost another of its leading members through the death, on July 24th, of Philip H. Manire, vice-president of the the Marshall Cotton Oil Company, Marshall, Texas. Mr. Manire would have celebrated his 77th birthday next October.

Mr. Manire was born in Tennessee and in 1893 entered business in Helena, Ark. A few years later he moved to Marshall, Texas, to



PHILIP H. MANIRE

accept the position of manager of the Marshall Cotton Oil Co., being later promoted to vice-president and member of the Board of Directors. He was also general manager of the Longview Cotton Oil Co., a director of the Marshall National Bank, and a vice-president of E. B. Hayes Machinery Co. Mr. Manire was for many years a member of the local Rotary Club. He was the first chief commissioner of the city of Marshall and a former president of the Marshall Chamber of Commerce.

In the National Fertilizer Association he has taken an active part for many years. A member of the Board of Directors for the past ten years, he was regularly returned to this office by the members of the industry in the southwest district (No. 9). He also served as chairman of the district.

Mr. Manire is survived by his wife and one sister.

J. W. TIDMORE

Dr. J. W. Tidmore, assistant director of the Alabama Experiment Station and head of the Department of Agronomy of the Alabama Polytechnic Institute, was killed in an automobile accident near Selma, Ala., on July 24th. E. L. Mayton and Dr. D. G. Sturkie, both coworkers of Dr. Tidmore, were injured in the same accident but are recovering. Dr. Tidmore was a graduate of Alabama Polytechnic Institute, class of 1919, received his master's degree in 1924, and his doctor's degree from the University of California in 1929. He is widely known for his work in soil chemistry and plant nutrition, especially for the practical nature of the experiments for which he was responsible. Dr. Tidmore will be remembered by many who attended the National Fertilizer Association convention last year, for his address there on "Some Problems Involved in Raising Farm Income."

CHILEAN NITRATE SALES CORPORATION ANNOUNCES NEW PRICES

The Chilean Nitrate Sales Corporation has announced prices on Chilean nitrate of soda for the period ending October 31, 1941. The new schedule sets the price for bulk material at $30.00 per ton, f.o.b. Atlantic, Gulf and Pacific ports. For nitrate of soda in 200-lb. bags the new price is $32.40 per ton; for this material in 100-lb. bags the new price is $33.00 per ton. The bulk price is $3.00 per ton higher than last season. For bagged goods the increases over last season are $3.70 per ton in 200-lb. bags and $3.60 per ton in 100-lb. bags.

The advances are based on higher ocean freight rates and insurance, and on the increased cost of bags. Before announcing the new prices, the company held a conference with the U. S. Office of Price Administration and Civilian Supply and other government agencies. During the calendar year 1940 imports of Chilean nitrate of soda amounted to 664,421 long tons. During the first five months of 1941, imports totaled 277,046 long tons.

Growing Vegetables Commercially*

By Stanley Q. Becker, Bristol, Pennsylvania

Vegetables are grown on 600 acres on which a few years ago were 7 farms where general crops were grown. These farms are located in Bensalem Township, Bucks County, all about three miles from the Delaware River. The soil is a silt loam, most of which has a clay subsoil. With the exception of small portions, drainage is good. The problem of sheet erosion is present in both winter and summer.

The acres of different crops being grown in 1941 are: spinach, 700; string beans, 150; celery, 100; cabbage, 60; bush lima beans, 50; carrots for bunching and winter storage, 50; beets for bunching, 40; parsnips, 25; cucumbers, 25; tomatoes for a commercial cannery, 20; field corn, 18.

Cover crops are sown in September, October, and early November. A mixture of grass seed with timothy predominating is used during September, after that mostly rye. Approximately 250 acres were in cover crops last winter. One hundred and twenty-fice acres of spinach were wintered over. Crops were harvested too late in the fall on a large acreage to plant any cover crops.

To produce high-quality vegetables and to maintain fertility, 4,000 tons of manure were applied at the rate of 10 to 15 tons per acre. With the exception of the manure made by 200 head of garbage-fed hogs, the manure was purchased. Practically all of this was spread on the ground during March, and in April superphosphate was mixed with the manure and loaded on the spreader.

Fertilizers purchased in 1940 and 1941 will amount to over 1,000 tons. On each acre of vegetables a minimum of 1,000 pounds of a complete fertilizer is used. Depending on the crop, the soil, and the season, either additional complete fertilizer or single-element material is added at various intervals. For instance, 200 pounds of nitrate of soda per acre is broadcast on some of the spinach when it is in the 2-leaf stage. Sixty tons of cyanamid were applied to the 250 acres of cover crops the past spring. On the fields where fertility is low and soil tests indicate phosphorus is low, 600 to 1,000 pounds of superphosphate per acre is worked into the soil after plowing, as the seedbed is being prepared. Celery has been side-dressed with nitrate of potash in addition to the complete fertilizer. Since this commodity is not available this year, some mixture of a similar nature will be substituted.

The only fertilizer analysis being used this year is 5-10-10. In the case of the string beans, cucumbers, and celery, a marked improvement in the quality of the crops was noticed a few years ago when 5-10-10 was used in comparison to 5-10-5. The high amount of potash may not be needed for the spinach, but it seems worthwhile to use it to build up the potash content of the soil for other crops. It simplifies operations to have only one analysis. Men often get the wrong fertilizer from the storage house when there are several analyses in the storage.

Lime is being used and has been used heavily in past years. This is especially true when farms that were used for general farm crops have been taken and prepared for growing vegetables. This year there will be about 200 tons of hydrated lime used; a few years ago as much as 250 tons were applied. Fields low in organic matter or where no manure has been applied for several years must be watched closely to keep sufficient available lime. When heavy applications of fertilizer are used con-

(Continued on page 18)

* An address at the Fertilizer Conference, State College, Pa., June 24 and 25, 1941.

BRADLEY & BAKER

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FERTILIZER MATERIALS MARKET

NEW YORK

Strong Market on All Fertilizer Materials with Demand Ahead of Supplies. Sales of Manure Salts Takes up Shortage in Potash Supplies.

Exclusive Correspondence to "The American Fertilizer."

NEW YORK, July 29, 1941.

The market in general in all essential fertilizer materials rules strong. It is strictly a seller's market since demand keeps ahead of supplies. This is particularly true of the inorganics but, despite this situation, there has been little or no change in prices on the heavy chemicals.

Sulphate of Ammonia

Many of the buyers' full requirements are still not contracted for. The price, however, remains unchanged at $29.00, f.o.b. ports; $29.00, delivered mid-western states; or $28.00, f.o.b. ovens—in bulk. The differentials for bagged material are $3.00 per ton additional for 200-lb. bags and $3.50 for 100-lb. bags. Exports of this item are difficult, if not impossible, due to inability to secure necessary licenses.

Potash

This material is still scarce but nevertheless is unchanged in price. It appears that there will be a shortage for the year although some of the slack in the high grade material has been taken up by recent substantial sales of manure salts. As for exports, this is impossible since licenses are unobtainable.

Nitrate of Soda

New season prices on the imported product have still not been announced. The current price is unchanged at $27.00 per ton, in bulk, f.o.b. ports.

Dried Blood

The market on this item is substantially the same as last reported, with $3.50 ($4.25½ per unit N) being asked for the South American material. Domestic sellers in the New York market are holding at $3.60 per unit ($4.37½ per unit N).

Fish Scrap

Chesapeake Bay unground menhaden fish scrap is still firm and strong. Fishing to date has been very good. The price remains unchanged at $4.60 ($5.59 per unit N) and 10 cents, f.o.b. fish factory in bulk, although there were a few recent outside sales at $4.65 ($5.65½ per unit N).

Tankage

Dry rendered tankage (Cracklings) are still firm. Price has advanced in the last two weeks and this last sold at 95 cents per unit of protein, f.o.b. New York. The market on wet rendered tankage is rather quiet but this is due to the fact that productions are well sold up. Last trading was done at $4.40 ($5.35 per unit N) and 10 cents, f.o.b. New York, but there are little or no offerings by sellers now.

BALTIMORE

Little Change in Fertilizer Materials Market. Feeding Ammoniates Somewhat Lower. Sulphate of Ammonia Booked to Capacity.

Exclusive Correspondence to "The American Fertilizer."

BALTIMORE, July 29, 1941.

There have not been any outstanding features in the market on fertilizer materials during the past two weeks. Organic ammoniates for feeding purposes are ruling slightly easier, but prices are still far above what manufacturers could afford to pay for fertilizer purposes.

Ammoniates.—Ground animal tankage for feeding is down to about $4.50 per unit of nitrogen and 10 cents per unit of B.P.L., f.o.b. basis Baltimore. South American ground dried blood is also ruling easier and figures about $3.75 per unit, c.i.f. Baltimore.

Nitrogenous Material.—The demand for this continues quiet, and the nominal market remains unchanged at about $3.25 per unit of nitrogen, f.o.b. Baltimore.

Sulphate of Ammonia.—Many fertilizer manufacturers have not yet been able to cover for their entire requirements, and first hands are not booking any additional business on the schedule price of $29.00 per ton, in bulk, f.o.b.

FERTILIZER MATERIALS

■

Let Us Quote You
on Your Requirements of These Materials

- PHOSPHATE ROCK
- SUPERPHOSPHATE
- DOUBLE SUPERPHOSPHATE
- NITRATE *of* SODA
- SULPHURIC ACID
- SULPHATE *of* AMMONIA
- BONE MEALS
- POTASH SALTS
- DRIED BLOOD
- TANKAGES
- COTTONSEED MEAL
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East St. Louis, Ill.
Greensboro, N. C.
Havana, Cuba
Houston, Texas
Jacksonville, Fla.
Montgomery, Ala.
Nashville, Tenn.
New Orleans, La.
New York, N. Y.
Norfolk, Va.
Presque Isle, Me.
San Juan, P. R.
Sandusky, Ohio
Wilmington, N. C.

ports. Practically no resale material is obtainable, and under present conditions it is likely that it will be most difficult to secure license for export, in view of the shortage which is bound to take place for domestic consumption due to diversion of tonnage for National Defense Program.

Nitrate of Soda.—Importers of the Chilean product have not yet announced new schedule of prices, and are still adhering to last year's schedule of $29.40 in 100-lb. bags, f.o.b. port warehouse; of course, this is subject to change without notice.

Fish Scrap.—It is rumored that there have been additional small sales at the equivalent of about $5.60 per unit of nitrogen and 10 cents per unit of B.P.L., f.o.b. fish factory, in bulk, for shipment "if and when made."

Superphosphate.—There is no change in the market which continues firm at $9.50 per ton of 2,000 pounds, basis 16 per cent for run-of-pile, and $10,00 for flat 16 per cent grade, no charge for overage, both in bulk, f.o.b. producers' works, Baltimore. Some of the producers are reported to be entirely sold up.

Bone Meal.—The market on both raw and steamed bone meal is unchanged, and 3 and 50 per cent steamed bone is nominally quoted at $37.50 to $38.00 per ton, while 4½ and 47 per cent is priced at about $38.00 per ton, f.o.b. Baltimore.

Potash.—There is no change in the market or conditions surrounding this commodity, but most of the manufacturers have now about covered for their normal requirements. With increase in production of the domestic product, it is anticipated that there will be sufficient tonnage of domestic potash available for legitimate manufacturing requirements of domestic fertilizer manufacturers.

Bags.—The market on burlap eased off somewhat since last report, and is now about $211.00 per thousand for plain, new, 10 oz., basis 40 cut 54 in., f.o.b. Baltimore. It is reported that the Government may put a price ceiling on burlap in view of the advances during the past year being in excess of 100 per cent.

TENNESSEE PHOSPHATE

Improved Weather Aids Crops. Quality Improves. AAA to Extend Distribution of Ground Rock Phosphate.

Exclusive Correspondence to "The American Fertilizer."

COLUMBIA, TENN., July 28, 1941.

Ordinary summer weather with thermometers mostly at the top point but with sufficiently frequent showers to keep some of the small grain in the shock has prevailed for the past two weeks. Pastures are generally green again and the corn is higher than the thermometer, with lots of heavy ears presaging a fine crop if we get a few rains in August.

Tobacco looks well, for the most part, with a few late planted areas and some planted not late enough looking pretty sick. Quality is fine and with corn and tobacco making even a fair crop, middle Tennessee is O.K.

Shipments of ground phosphate rock for direct application have started up with almost midseason activity during the last ten days and August and September, always the largest consuming months of the year in that line, give every prospect of being well above the same months of last year, which was the banner year since 1930.

Up to ten or twelve years ago, the great bulk of the ground rock for direct application was shipped from Tennessee from July 15th to October 15th, but this has gradually changed until March and April now show almost as large shipments as August/September, which makes it a much easier task for producers than

Manufacturers' Sales Agents for **DOMESTIC**

Sulphate of Ammonia

Ammonia Liquor :: Anhydrous Ammonia

HYDROCARBON PRODUCTS CO., INC.

500 Fifth Avenue, New York

it used to be when all the business was in one season.

While the AAA experiment of applying grant of aid practices to ground phosphate rock in eleven counties in Illinois, resulted in only a few hundred tons being distributed through that channel in the last season it is rumored that this use will reach much larger figures in the fall season approaching and that AAA may put this practice into effect all over Illinois.

Of course, ordinary sellers of ground rock cannot compete with the Government any more than sellers of superphosphate can, as AAA not only takes care of all selling and handling costs, but finances as well. It is hoped that the advertisement may sell more ground rock, as it has acid phosphate.

The AAA price is $11.50 on low grade waste product rock with AAA paying part of freight to give that average. Their price on 20 per cent superphosphate is $17.00, against regular price of $24.00 in Illinois. Farmers ought to load up on both these bargains.

CHICAGO

Lack of Activity in Fertilizer Organics Market Due to Short Supply. Feed Materials Show Increased Demand.

Exclusive Correspondence to "The American Fertilizer."

CHICAGO, July 28, 1941.

Other than reported sales of nitrogenous at advanced figures, no activity has occurred in the organic market. This has undoubtedly been caused by the lack of offerings of fertilizer material. Business in steamed bone has been fairly active, resulting in sellers again advancing asking prices.

List prices of digester tankage and meat scraps were advanced recently, which created increased demand for materials in a market already well sold.

Nominal prices are as follows: High grade ground fertilizer tankage, $3.50 to $3.75 ($4.25½ to $4.56 per unit N) and 10 cents; standard grades crushed feeding tankage, $4.75 to $4.90 ($5.77½ to $5.95½ per unit N) and 10 cents; blood, $3.75 to $3.80 ($4.56 to $4.62 per unit N); dry rendered tankage, 97 to 102½ cents per unit of protein, Chicago basis.

GROWING VEGETABLES COMMERCIALLY

(Continued from page 14)

tinuously, they sometimes fail to give the desired response unless some lime is added.

Soil samples from the 46 different fields are collected each fall and complete tests are made. The results of the tests are used as a guide in determining the program of each crop in each field. When growth of some crops is not satisfactory, a soil sample is taken and quick tests are run.

The placing of the fertilizer is in the row and as a sidedressing for beans, cabbage, and celery. For spinach, carrots, cucumbers, and parsnips, all fertilizer is broadcast before planting. So far no complete fertilizer has been plowed under.

Subsoiling is practiced on fields where root crops and celery are grown. This year an orchard harrow, pulled with a crawler-type tractor, has done an effective job in loosening the subsoil.

Portable irrigation is used when needed on 300 acres of the farm. Celery receives more water than any other crop. Seven tractors are used on the farm, and to haul the crops to eastern markets seven road trucks are used. For hauling fertilizer to the fields, and crops to the pack house, 10 to 12 farm trucks are in operation.

The grading and packing of the vegetables is an operation in itself. Entirely different

PULVERIZED MASCOT LIMESTONE
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MAGNESIUM LIMESTONE
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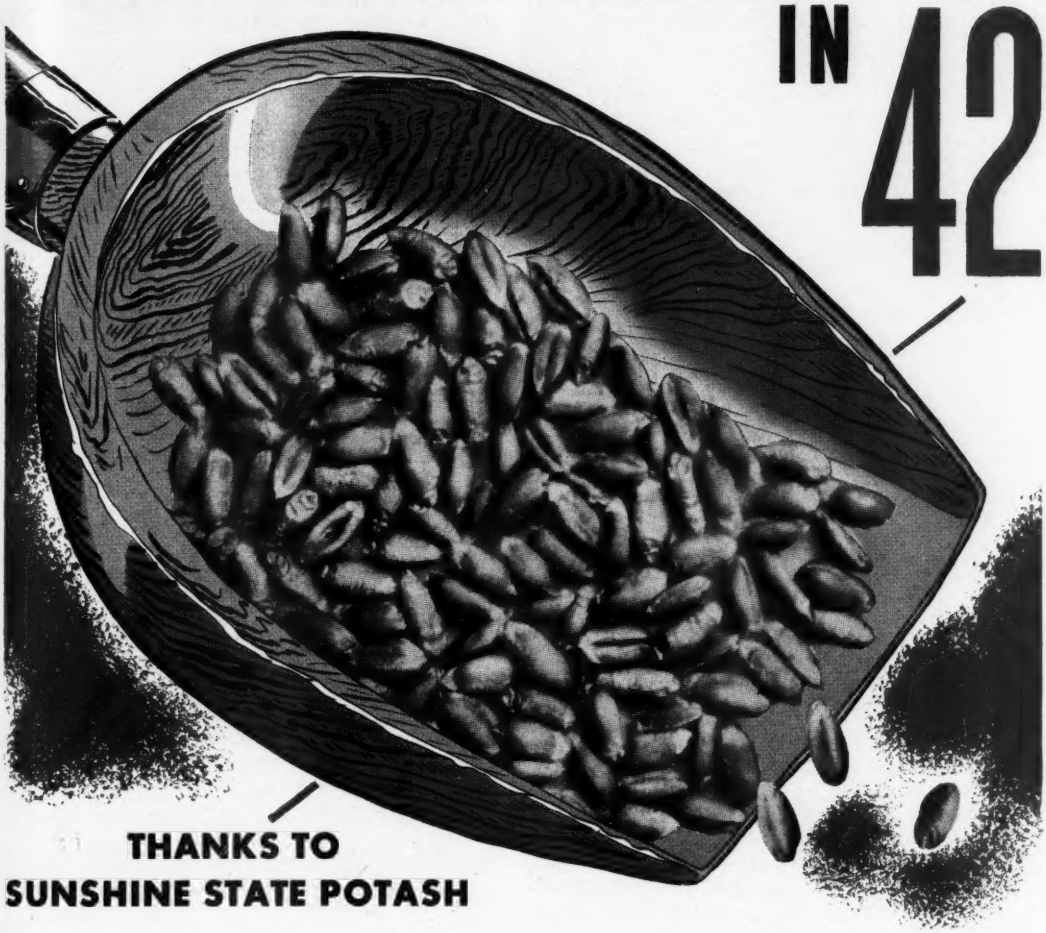
PLUMP AND PLENTIFUL IN 42



THANKS TO SUNSHINE STATE POTASH

● For bumper crops in '42, include plenty of potash in the fertilizer mix you are now preparing for fall planting. Potash is one of the plant foods which help winter wheat and other small grains develop a quicker start in life. It encourages resistance to disease and winter injury. It grows stronger stems and prevents lodging, develops longer heads, plumps out kernels, and makes grains heavier.

At a time of increasing dependence upon scientific methods of agriculture, great credit is due to those progressive fertilizer manufacturers who today are supplying producers of all major crops with complete fertilizers containing potash as recommended by local agricultural authorities. To them we offer Sunshine State Potash, a clean, free-flowing material of uniform analysis well suited to fertilizer manufacture.

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personnel is used at the wash house than is used in the field. Girls grade beans and pack spinach, while colored help is used for the celery. All crops graded under U. S. No. 1 are sent to market with a Becker Farms Label on the package.

OPPORTUNITIES FOR IMPROVING SOUTHERN AGRICULTURE

(Continued from page 9)

other good southern plants have about disappeared. Diseases and insects have taken their toll. It is clearly evident that the southern states need a program designed to develop plants resistant to cold, drought, insects, diseases, and soil complexes. This is no small undertaking, but it is essential to the well-being of future agricultural stability in the southern states. Last year in one large southern state 90 per cent of the cotton acreage was planted with a recently developed good breed of cotton. I think this illustrates and emphasizes the importance of plant breeding.

There has been some, but not much, interest in relation and effectiveness of nutrient absorption under existing conditions of low and excessive moisture. There is and has been much duplication and repetition of effort in research. This seems essential. It may not be classed as wasted effort. However, after it becomes a well established principle that low nitrogen and high potash are essential nutrient requirements for tobacco, the farmer's interest is served. But his well being may not be served. However, an understanding of the relation of potassium, calcium, and magnesium in metabolism under the wide conditions under which the crop is grown, is worthy of lengthy study. The relation of nitrogen to other elements in assimilation and absorption is worthy of extensive study—especially in southern soils. There is some evidence that nitrogen may be the catalytic agent essential to the functioning of the other elements. More information on the ability of plants to choose certain available chemicals to build up a varied composition seems important. There are many diseases caused by parasites that appear to be influenced by plant behavior indicating nutrient complex. The relation of one element to another in the plant cell may influence this condition. Research methods may never reach the perfection essential for calibrating some of the true relations existing within the cell, but some understanding of a helpful nature may be forthcoming from the "pure science" approach.

At what state in the growth of the plant are the minor elements functionally most useful? What are the effects of magnesium, potassium, and calcium on the ability of the plant to produce oils? What are the effects of copper, manganese, and other minor elements on sex and seed production? Why are the rarer elements found in plants? Why do some plants produce excretions and latexes? Why are some roots susceptible to organisms that others are immune to? How can the phosphates be kept continuously available. How can the necessary sulphur for the essential function of plants be determined? What are the purposes of biological activity in the soil and what is its relation to plant assimilation of nutrients?

These are just a few of the very important problems for the research worker that the southern farmer would like to know more about. Facts would help the southern farmer's morale about as much as they would help his mind and his pocketbook. He needs research and more research. He needs education beyond the borders of his community and county and he needs fuller appreciation of his home merchants. In the southern states there are many well distributed cities which are well suited for small industries. Agricultural prosperity and merchant prosperity involve continuity in America's future stability and we may as well work toward that end.

NITROGANIC TANKAGE

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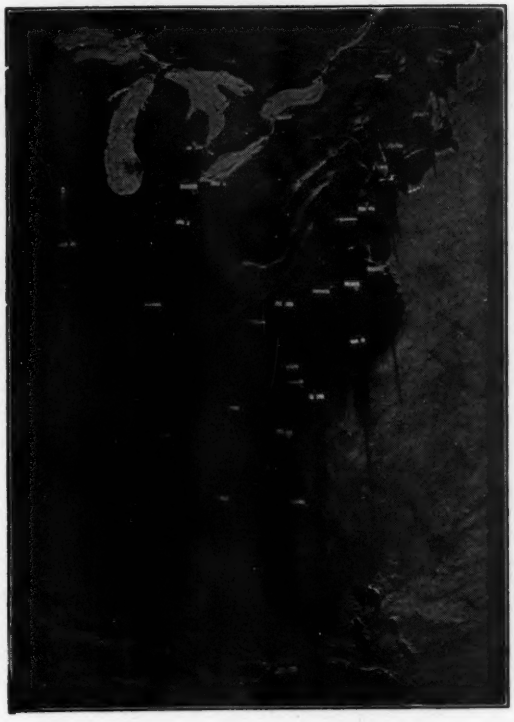
We manufacture all grades of Commercial Fertilizers, Superphosphate, Agrinite Tankage, Bone Black, Bone Black Pigments (Cosmic Black), Dicalcium Phosphate, Monocalcium Phosphate, Gelatin, Glue, Ground Limestone, Crushed Stone, Agricultural Insecticides (including Pyrox, Arsenate of Lead, Calcium Arsenate, etc.), Trisodium and Disodium Phosphate, Phosphorus, Phosphoric Acid, Sulphuric Acid, Salt Cake; and we are importers and/or dealers in Nitrate of Soda, Cyanamid, Potash Salts, Sulphate of Ammonia, Raw Bone Meal, Steamed Bone Meal, Sheep and Goat Manure, Fish, Blood and Tin-Tetrachloride. We mine and sell all grades of Florida Pebble Phosphate Rock.



FACTORIES

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Buffalo, N. Y.
Carteret, N. J.
Cayce, S. C.
Chambly Canton, Quebec, Can.
Charleston, S. C.
Cincinnati, Ohio
Cleveland, Ohio
Detroit, Mich.
East Point, Ga.
East St. Louis, Ill.
Greensboro, N. C.
Havana, Cuba
Henderson, N. C.
Montgomery, Ala.
Norfolk, Va.
No. Weymouth, Mass.
Pensacola, Fla.
Pierce, Fla.
Port Hope, Ont., Can.
Presque Isle, Me.
Savannah, Ga.
Searsport, Maine
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Pierce, Fla.
Port Hope, Ont., Can.
St. Paul, Minnesota
Savannah, Ga.
Spartanburg, S. C.
Wilmington, N. C.

PINKERTON AND BRADLEY START NEW COMPANY

E. S. Pinkerton and A. T. Bradley, who had been connected with the Miller Chemical & Fertilizer Corporation, which operates a mixing plant on South Caroline street, Baltimore, have withdrawn from that concern and are promoting the construction of a factory at Delta, Pa., which will get into production shortly. Mr. Pinkerton was formerly connected with the Davison Chemical Company, as was Newton Long, the president of the Miller Company, who is continuing the operation of the plant.

SOUTHERN GRASSLAND CONFERENCE

The Southern Grassland Conference at Raleigh, N. C., July 23rd, was attended by about 275 agricultural workers representing 12 Southern States. Speakers included Dr. O. S. Aamodt, Dr. Sherman B. Johnson, T. E. Woodward, R. Y. Bailey, all of the U. S. Department of Agriculture; Dr. E. M. Brown, University of Missouri; Director R. M. Salter and Dr. L. D. Baver, North Carolina State College; W. W. Fitzpatrick, Rougemont, N. C., and R. H. Lush, National Fertilizer Association.

The central theme of the talks and discussions which followed was that the South had already shifted to increase livestock production but that nearly all parts are still short of high-quality feed. That high-quality feed can be produced profitably and readily by the use of fertilizer was mentioned by every speaker. Special emphasis was given to the use of supplementary grazing crops and their fertilization. This was emphasized by Superintendent J. W. Hendricks of the State Test Farm at Statesville, where high barley yields plus 8 months' grazing are obtained per year with the use of 650 pounds of fertilizer per acre.

One afternoon session was devoted to a discussion of lawns, road embankment, and airport improvement. Several speakers mentioned that their recommendations for the latter purpose were in excess of 1,000 pounds of complete fertilizer per acre for thick coverage on the many airport fields under Government construction. Dr. John Monteith who is offering technical advice in this defense activity acted as chairman and recommended the Association's pamphlet, "Improving Grass in Lawns, Parks, Fairways, and Athletic Fields," as the best publication on the subject. Representatives of the North Carolina and Virginia highway commissions requested a supply.

JUNE SULPHATE OF AMMONIA PRODUCTION

The statistics compiled by the U. S. Bureau of Mines show that production of by-product sulphate of ammonia during June reached a total of 61,392 tons which was an infinitesimal decrease from the May figures of 61,495 tons and only a slight increase over June, 1940, production of 58,599 tons.

During the first half of the calendar year, the output amounted to 368,355 tons in 1941 and 341,201 tons in 1940. At the end of June, stocks on hand at producing points totaled 32,641 tons, an increase of about 20 per cent over stocks on hand May 31st which totaled 26,956 tons.

By-product ammonia liquor production also continued at peak levels, 2,703 tons (NH_3 content) being produced in June, 1941; 2,679 tons in May, 1941; and 2,202 tons in June, 1940. Stocks on hand at the end of June amounted to 842 tons, compared with 763 tons at the end of May.

FARM SITUATION IMPROVING

The U. S. Department of Agriculture has recently summarized the agricultural situation as follows:

"Increased industrial production and the largest national income in our history are providing good domestic markets for farm products. Prices of farm products have advanced, but many products continue to stand lower in purchasing power than in the 1910-14 period of parity. Farm income in the first half of 1941 was the largest in more than a decade, but total for the full year will be about 9 per cent of the national income. Farm income in 1929 was 10 per cent of the national income. The comparable figure for 1910-14, allowing for the

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Information and references available on request.

AMERICAN POTASH & CHEMICAL CORPORATION
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Pioneer Producers of Muriate of Potash in America
See Page 4

greater increase in city than in farm population, is about 12 per cent.*** The 1941 season began with production prospects unusually bright, then drought intervened to cause anxiety for crop prospects in the east, subsequent rains repaired much of the damage. Unless bad weather should prevent, the outturn of crops and livestock products may be the largest on record. There should be plenty of food for us and for Britain.*** Markets are being aided by the unusually good domestic demand and by Government purchases of foods for relief distribution and for export. Nevertheless, it is likely that prices will advance less in the last half year than the advance in the first half."

WHEAT QUOTAS VOTED

Official results of the wheat marketing quota referendum held May 31st show 559,630 wheat farmers voted in 40 states. Of this number, 453,569 or 81 per cent were in favor of marketing quotas, and 106,061 or 19 per cent opposed the quota. Quotas were placed in effect on the 1941 wheat crop, the first to be marketed under quotas.

FERTILIZER COOPERATIVE ELECTS OFFICERS

The stockholders of the Cooperative Fertilizer Service, Inc., of Baltimore, an affiliate of the Southern States Cooperative, met on July 25th in Baltimore and elected the following officers: President, T. K. Wolfe, Richmond, Va.; first vice-president, H. S. Agster. Harrisburg, Pa.; second vice-president, D. W. Eamon, Raleigh, N. C.; executive vice-president, M. F. Borden, Baltimore, Md., and secretary-treasurer, O. P. Bernhardt, Baltimore.

It was also voted to set aside as a reserve fund for meeting contingencies all of the current earnings with the exception of the dividend on the stock.

AMERICAN POTASH INDEPENDENCE ACHIEVED

(Continued from page 7)

quired by other countries less fortunately situated. To curb this drain on supplies for our own agricultural and chemical industries, and in recognition of the constructive efforts by the industry itself to safeguard these requirements, the Federal Government placed potash under the export licensing system, effective February 2, 1941.

The policies of the American potash industry with respect to exporting their products are worthy of review here. When the present war broke out the officials of the Department of Commerce interviewed representatives of the American potash producers, and developed the fact that the output of their plants, added to the imports of potash that might be expected, would be sufficient to meet the requirements of the American market both for potassium materials to be used in fertilizers and in the manufacture of other chemicals. However, it was apparent that it would not be safe to continue the export of high-grade refined potash materials; thereupon the American producers readily agreed to discontinue the export of these products, and furthermore voluntarily suspended the operation of their Potash Export Association, which had been engaged in the distribution of their products in Europe. Likewise, the two companies which had been exporting their materials to Japan also voluntarily withdrew from that foreign market.

The export control put into effect in February of this year covered all potassium materials containing more than 27 per cent K_2O. As the situation now stands, only run-of-mine salts may be exported without a license. and small shipments of ore from the New Mexico

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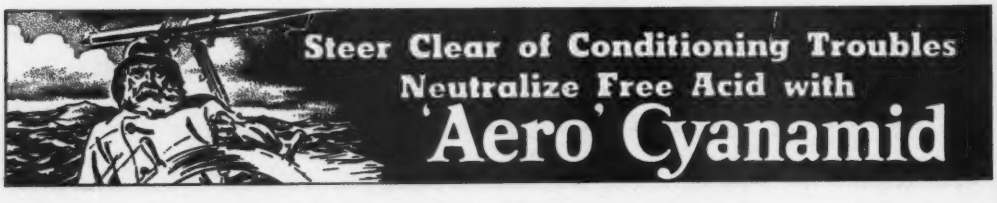

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fields are being made at the present time through the Export Association with the full approval of Government authorities. It is to be hoped that it will not be necessary under any circumstances to export high-grade refined materials, and this should never happen during the war emergency, unless owing to shortage of ships it becomes essential to supply England with high-grade materials for her agricultural and chemical industries. However, it appears that England is quite likely to obtain sufficient potash for her normal needs from Spain and Palestine.

The Problems of Advancing Costs

The speakers who have preceded me on this program presenting the problems confronting nitrogen and phosphate producers mentioned their difficulties in obtaining adequate transportation facilities, particularly by water. All of the American potash producers are confronted with the same problems. Formerly the bulk of the potash tonnage from California moved eastward through the Panama Canal; that from New Mexico moved by rail to Texas City and thence to the Gulf and Atlantic ports by boat. Coastwise vessels are now engaged in transatlantic or other services closely associated with the war effort, and it is likely that practically all of the potash tonnage must move this year from the West to the fertilizer-using areas by rail. This, of course, means a greatly increased cost of transportation.

Wages, too, are higher in the potash industry. There have been sizable wage increases in the New Mexico plants, and we are all well aware of the demands on the California Company which were referred to the National Mediation Board. The cost of materials and supplies are higher; and the industry, of course, encounters the same difficulties that other manufacturers have had to face in maintaining the priorities for small but essential supplies of aluminum, nickel-alloy steel, and other items that must go into the repairs of plants subject to the exceptional corrosion that goes with the handling of saline liquors.

Mention has been made of the cost of fuel and the possible lack of oil supplies needed in the manufacture of other essential fertilizer materials. Fortunately, the potash industry does not face a shortage of fuel since, in the New Mexico field, natural gas is used; and in California, the potash plant is not far distant from ample supplies of fuel oil.

However, nothing that I have said with reference to these higher costs and other difficulties confronting the industry materially changes the outlook for ample potash supplies for the requirements of the fertilizer industry. There will be a large supply of refined materials in the higher grades of muriate, and there will be run-of-mine salts in whatever quantity may be needed to fill any gap between expected consumption of potash and the amount of refund muriate available. It is to be hoped that there will be no disposition now or later to curtail the use of potash in fertilizers just to avoid the use of the run-of-mine materials. And in this connection it may be recalled that in comparison with the 20 per cent salts formerly imported in such large tonnages, our American run-of-mine salts are considerably better; as late as 1930, we imported 112,000 tons of kainite and 362,000 tons of manure salts, a total of 474,000 tons of salts in these two categories.

Cooperation Appreciated

I express my appreciation of the assistance the potash industry is accorded at all times by the Federal Department of Interior, Agriculture, and Commerce in the collection and dissemination of statistical and other information, and applying conservation principles in the administration of the potash resources of the public domain. The highest commendation is also due the scientific authorities of the Department of Agriculture, State Colleges and Experiment Stations, and our own American Potash Institute for the high caliber of agronomic research and gratifying results obtained in various lines of scientific exploration and experimentation. And finally, and I am surely speaking for the other companies as well as my own (I think I can safely present their view on this subject) when I say that we all value the fine support that we have received from the fertilizer industry, the broad-gauge viewpoint that its individual members have taken of the measures now being put into effect, which have resulted in their not obtaining as much of high-grade material as they perhaps have wanted, while gladly cooperating to the fullest extent in considering the purchase and use of other salts that are available in abundance. With all of us working together, the members of the potash industry, our friends in the fertilizer and chemical industries, and the authorities engaged in research, we can ride out this storm of war to the time when there will be no more war, and we can do it without loss of any of the advantages that have been gained, without any backward steps being taken, and with little if any increase in prices of this important material.

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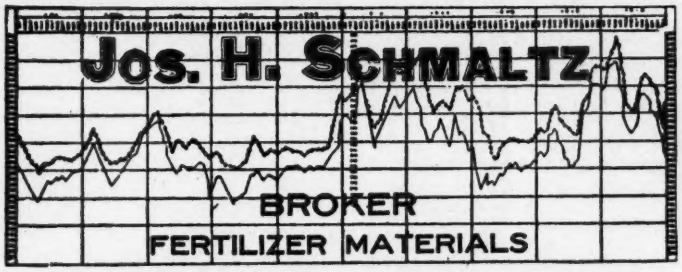

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For Alphabetical List of Advertisers, see page 33.

ACID BRICK
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

ACID EGGS
Chemical Construction Corp., New York City.

ACIDULATING UNITS
Chemical Construction Corp., New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.

AMMO-PHOS
American Cyanamid Co., New York City.

AMMONIA—Anhydrous
Barrett Company, The, New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.
Hydrocarbon Products Co., New York City.

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AMMONIATING EQUIPMENT
Sackett & Sons Co., The A. J., Baltimore, Md.

AMMONIUM NITRATE SOLUTIONS
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Bemis Bro. Bag Co., St. Louis, Mo.

BAGS—Cotton
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BAGS—Paper
Bagpak, Inc., New York City.
Bemis Bro. Bag Co., St. Louis, Mo.

BAGS (Waterproof)—Manufacturers
Bemis Bro. Bag Co., St. Louis, Mo.

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Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

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Bagpak, Inc., New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.

BAG PILERS
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Link-Belt Company, Philadelphia, Chicago.

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Link-Belt Company, Philadelphia, Chicago.
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Sackett & Sons Co., The A. J., Baltimore, Md.

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Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

BELTING—Leather, Rubber, Canvas
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Sackett & Sons Co., The A. J., Baltimore, Md.

BOILERS—Steam
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Armour Fertilizer Works, Atlanta, Ga.
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BONE PRODUCTS
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Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

BORAX AND BORIC ACID
American Potash and Chem. Corp., New York City.
Pacific Coast Borax Co., New York City.

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Dickerson Co., The, Philadelphia, Pa.
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Keim, Samuel L., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Taylor, Henry L., Wilmington, N. C.
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Link-Belt Company, Philadelphia, Chicago.

BURNERS—Sulphur
Chemical Construction Corp., New York City.

BURNERS—Oil
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.

CABLEWAYS
Hayward Company, The, New York City.

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American Agricultural Chemical Co., New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.

CARS—For Moving Materials
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CARTS—Fertilizer, Standard and Roller Bearing
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

CASTINGS—Acid Resisting
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.

CASTINGS—Iron and Steel
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CEMENT—Acid-Proof
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
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CHAIN DRIVES—Silent
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Stedman's Foundry and Mach. Works, Aurora, Ind.

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Link-Belt Company, Philadelphia, Chicago.
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Stedman's Foundry and Mach. Works, Aurora, Ind.

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Barrett Company, The, New York City.
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CHEMICALS—Continued
Huber & Company, New York City.
Phosphate Mining Co., The, New York City.
Wellmann, William E., Baltimore, Md.

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Fairlie, Andrew M., Atlanta, Ga.
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Gascoyne & Co., Baltimore, Md.
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Stillwell & Gladding, New York City.
Wiley & Company, Baltimore, Md.

CLUTCHES
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Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CONCENTRATORS—Sulphuric Acid
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.

CONDITIONERS AND FILLERS
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Dickerson Co., The, Philadelphia, Pa.
Phosphate Mining Co., The, New York City.

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Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Schmaltz, Jos. H., Chicago, Ill.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

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Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

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Jeffrey Manufacturing Co., The, Columbus, Ohio.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

DRYERS—Direct Heat
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Sackett & Sons Co., The A. J., Baltimore, Md.

DRIVES—Electric
Link-Belt Company, Philadelphia, Chicago.

DUMP CARS
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

DUST COLLECTING SYSTEMS
Sackett & Sons Co., The A. J., Baltimore, Md.

ELECTRIC MOTORS AND APPLIANCES
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

ELEVATORS
Atlanta Utility Works, East Point, Ga.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ELEVATORS AND CONVEYORS—Portable
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ENGINES—Steam
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

EXCAVATORS AND DREDGES—Drag Line and Cableway
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Link Belt Speeder Corp., Chicago, Ill., and Cedar Rapids, Iowa.

FERTILIZER MANUFACTURERS
American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Farmers Fertilizer Co., Columbus, Ohio
International Agricultural Corporation, Chicago, Ill.
Phosphate Mining Co., The, New York City.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Taylor, Henry L., Wilmington, N. C.
Wellmann, William E., Baltimore, Md.

FOUNDERS AND MACHINISTS
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GARBAGE TANKAGE
Wellmann, William E., Baltimore, Md.

GEARS—Machine Moulded and Cut
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GEARS—Silent
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

GELATINE AND GLUE
American Agricultural Chemical Co., New York City.

GUANO
Baker & Bro., H. J., New York City.

HOISTS—Electric, Floor and Cage Operated, Portable
Hayward Company, The, New York City.
Jeffrey Manufacturing Co., The, Columbus, Ohio.

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Atlanta Utility Works, East Point, Ga.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
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Stedman's Foundry and Mach. Works, Aurora, Ind.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Wellmann, William E., Baltimore, Md.

IRON SULPHATE
Tennessee Corporation, Atlanta, Ga.

INSECTICIDES
American Agricultural Chemical Co., New York City.

LACING—Belt
Sackett & Sons Co., The A. J., Baltimore, Md.

LIMESTONE
American Agricultural Chemical Co., New York City.
American Limestone Co., Knoxville, Tenn.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Wellmann, William E., Baltimore, Md.

LOADERS—Car and Wagon, for Fertilizers
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.
Duriron Co., Inc., The, Dayton, Ohio.
Fairlie, Andrew M., Atlanta, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Coal and Ash Handling
Hayward Company, The, New York City.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Elevating and Conveying
Atlanta Utility Works, East Point, Ga.
Hayward Company, The, New York City.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

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MACHINERY—Power Transmission
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MAGNETS
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MANGANESE SULPHATE
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Tennessee Corporation, Atlanta, Ga.

MIXERS
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Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

NITRATE OF SODA
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Company, The, New York City.
Bradley & Baker, New York City.
Chilean Nitrate Sales Corp., New York City.
Huber & Company, New York City.
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Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

NITRATE OVENS AND APPARATUS
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NITROGEN SOLUTIONS
Barrett Company, The, New York City

NITROGENOUS ORGANIC MATERIAL
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
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Huber & Company, New York City.
International Agricultural Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Smith-Rowland Co., Norfolk, Va.
Wellmann, William E., Baltimore, Md.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.

PACKING—For Acid Towers
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

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Chemical Construction Corp., New York City.

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Huber & Company, New York City.
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Schmaltz, Jos. H., Chicago, Ill.
Southern Phosphate Corp., Baltimore, Md.
Taylor, Henry L., Wilmington, Del.
Wellmann, William E., Baltimore, Md.

PIPE—Acid Resisting
Duriron Co., Inc., The, Dayton, Ohio.

PIPES—Chemical Stoneware
Chemical Construction Corp., New York City.

PIPES—Wooden
Stedman's Foundry and Mach. Works, Aurora, Ind.

PLANT CONSTRUCTION—Fertilizer and Acid
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

POTASH SALTS—Dealers and Brokers
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Agricultural Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
Schmaltz, Jos. H., Chicago, Ill.
Taylor, Henry L., Wilmington, Del.
Wellmann, William E., Baltimore, Md.

POTASH SALTS—Manufacturers and Importers
American Potash and Chem. Corp., New York City.
Potash Co. of America, Baltimore, Md.
United States Potash Co., New York City.

PULLEYS AND HANGERS
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

PUMPS—Acid-Resisting
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

PYRITES—Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., New York City.
Jett, Joseph C., Norfolk, Va.
Wellmann, William E., Baltimore, Md.

QUARTZ
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

RINGS—Sulphuric Acid Tower
Chemical Construction Corp., New York City.

ROUGH AMMONIATES
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Schmaltz, Jos. H., Chicago, Ill.
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SEPARATORS—Air
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Sackett & Sons Co., The A. J., Baltimore, Md.
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SHOVELS—Power
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Link-Belt Speeder Corp., Chicago, Ill., and Cedar Rapids, Iowa.
Sackett & Sons Co., The A. J., Baltimore, Md.

SPRAYS—Acid Chambers
Monarch Mfg. Works, Inc., Philadelphia, Pa.

SPROCKET WHEELS (See Chains and Sprockets)

STACKS
Sackett & Sons Co., The A. J., Baltimore, Md.

SULPHATE OF AMMONIA
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Taylor, Henry L., Wilmington, N. C.

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Wellmann, William E., Baltimore, Md.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
International Agricultural Corporation, Chicago, Ill.
Phosphate Mining Co., The, New York City.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

SYPHONS—For Acid
Monarch Mfg. Works, Inc., Philadelphia, Pa.

TALLOW AND GREASE
American Agricultural Chemical Co., New York City.

TANKAGE
American Agricultural Chemical Co., New York City.
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Bradley & Baker, New York City.
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TANKAGE—Garbage
Huber & Company, New York City.

TANKS
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Sackett & Sons, Co., The A. J., Baltimore, Md.

TILE—Acid-Proof
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

TOWERS—Acid and Absorption
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.

UNLOADERS—Car and Boat
Hayward Company, The, New York City.
Jeffrey Manufacturing Co., The, Columbus, Ohio.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

UREA
DuPont de Nemours & Co., E. I., Wilmington, Del.

UREA-AMMONIA LIQUOR
DuPont de Nemours & Co., E. I., Wilmington, Del.

VALVES—Acid-Resisting
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
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Jeffrey Manufacturing Co., The, Columbus, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

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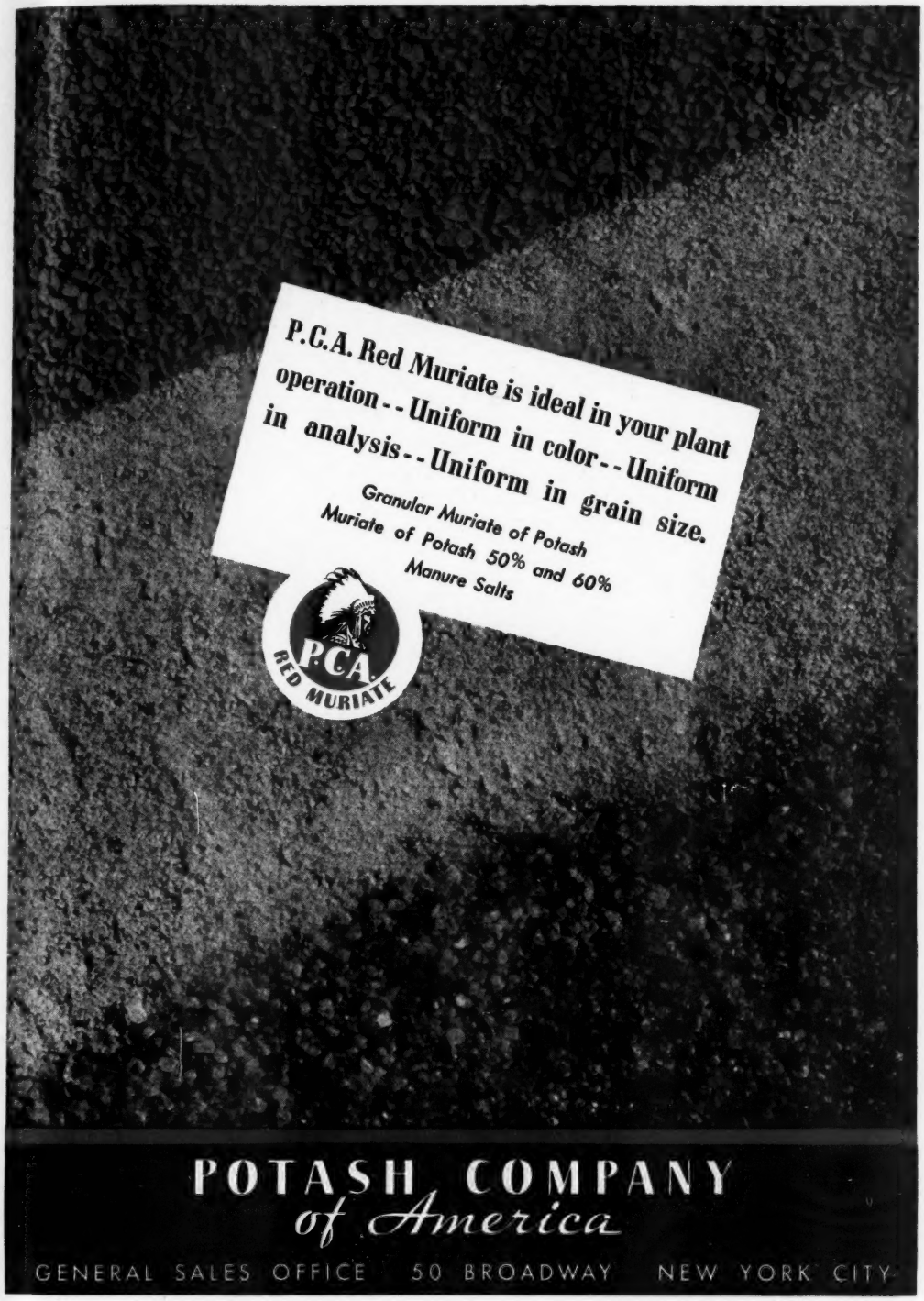
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